Hints for Chapter 5 Homework

March 6, 2004

16 Given the minimum number of hours that the student wants to take on Mon., Thurs., and Fri., there are 6 remaining class hours to be allocated among the 5 days of the week. This can be done in $\binom{6+5-1}{6}$ ways (think lattice paths).

19 If the student takes 0 hours on F, then she must take at least 1 on R, leaving 7 hours to be distributed among MTWR in $\binom{7+4-1}{7}$ ways. If the student takes 1 hour on F, then at least 2 must be taken on R, leaving 5 other hours to distribute among MTWR. *Etc.*

20 Choose any nonempty set $\emptyset \neq X \subsetneq [n]$; X and $[n] \setminus X$ form a 2-class partition of $[n]$ (and all are formed this way). In how many ways can this be done? (Don't double count.)

21 There must be 1 class of size 2 and $n-2$ classes of size 1; in how many ways can the class of size 2 be chosen?

22 The largest class in the partition (into $n-2$ classes) can either have size 3 (leaving $n-3$ classes of size 1) or size 2 (in which case there must be 2 such classes, leaving $n-4$ classes of size 1). In how many ways can you pick a class of size 3? How about a pair (unordered) of classes of size 2?